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SOLAR–CUM–SMOKE DRIER FOR RAW SHEET RUBBER

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A solar-cum-smoke drier for drying raw rubber sheets has been designed and fabricated combining the facilities of solar drying and smoke drying. The main source of energy used in the system is sunlight, harnessing the energy using flat plate solar collectors. Hot smoke obtained by burning firewood provided the subsidiary source of energy. Evaluation of the drier showed that, without subsidiary heating, the drying period was 8–12 days as against 4–5 days in conventional smoke drying. However, with the subsidiary heating using firewood, the drying time could be brought down to 5 days. As compared with conventional smoke drying, the saving in firewood while using solar-cum-smoke drier is found to be around 70 per cent. The rate of drying of sheet rubber in the drier and the overall efficiency of the solar drying system have been determined and discussed.

Key words- Solar drying, Firewood back-up, Sun drying, Solar intensity, Drying efficiency.

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INTRODUCTION

Among the different forms of processed natural rubber, ribbed smoked sheet constitutes 65 per cent of the total produce in India. Most of the small holdings are processing their rubber in this form. Ideally, the sheets are dried and smoke - cured in smoke houses where firewood is burnt for the purpose. The consumption of firewood is reported to be 1 kg per kilogram rubber (Edgar, 1958). Although fire wood of hardwood species is the best, its availability is limited and cost rather high. Therefore, rubber wood has been in common use. Of late, rubber wood is getting extensively used as fuel in homes and factories and as timber for making packing cases, furniture, etc., and this has resulted in reducing its availability and increasing price (Haridasan and Srinivasan, 1985). This has stimulated a search for alternative sources of energy for drying rubber sheets.

Driers with electrical heating devices have already been fabricated and evaluated (Radhakrishnan Nair *et al*, 1985). A liquified petroleum gas fuelled drier for drying natural rubber sheets has also been proposed (Anandan *et al*, 1988). But these processes are costlier than the conventional smoke drying. Hence, in order to reduce the cost of drying of sheet rubber and also to improve its quality, solar energy was proposed as an alternative source (Walpita *et al*, 1984). Solar drying is already being employed for drying agricultural produces like paddy, ginger, etc., and solar water heaters are being commercially used in many fields.

Solar drying so far as rubber is concerned has its limitations, namely, (a) sunlight is available only during day time whereas drying of rubber should be desirably continuous so as to complete the process within a short span of time, (b) rain interference